

WHAT IS CLAIMED IS:

1. A method for reproducing records for optical recording medium -which has a plurality of non-writable areas of different phases between writable data areas containing wobbled information on a track for recognizing a reference frequency to distinguish profiles of the data areas, the method comprising the steps of:

(a) determining a difference between a difference signal of optical reflecting signals of the optical recording medium detected at the non-writable area and the center level at an adjacent data area to output a first signal;

(b) determining a difference between a difference signal of optical reflecting signals of the optical recording medium detected at a second non-writable area and the center level at an adjacent area to output a second signal, the second non-writable area being different in phase from the non-writable area;

(c) determining a difference between the first signal and the second signal to output a variation;

(d) comparing the variation with a predetermined threshold, determining that detrack has occurred, if the variation exceeds the threshold, and outputting the resulting value; and

(e) performing a tracking servo based on the resulting value.

2. The method as claimed in claim 1, wherein the difference signal between the optical reflecting signals includes a read channel 2 signal generated from electrical signals output in proportion to the quantity of beam reflected from the optical recording medium.

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3. The method as claimed in claim 2, wherein the center level at the data area includes a center voltage of a wobble signal detected at the data area.

4. The method as claimed in claim 2, wherein the steps (a) and (b) of generating the first and second signals use only a defined part of the non-writable areas.

5. The method as claimed in claim 4, wherein the steps (a) and (b) of generating the first and second signals use variable frequency oscillator (VFO) areas of the non-writable areas.

6. The method as claimed in claim 2, wherein in the steps (a) and (b) of generating the first and second signals, the first signal is a potential difference between the read channel 2 signal detected at the non-writable area and a wobble center level, and the second signal is a potential difference between the read
5 channel 2 signal detected at the second non-writable area and the wobble center level at the adjacent data area, the second non-writable area being different in phase from the non-writable area.

7. The method as claimed in claim 1, wherein the difference signal between the optical reflecting signals includes a tracking error signal obtained by filtering the read channel 2 signal generated from electrical signals output in proportion to the quantity of beam reflected from the optical recording medium.

8. The method as claimed in claim 7, wherein the center level at the data area includes the center level of the tracking error signal detected at the data area.

9. The method as claimed in claim 7, wherein in the steps (a) and (b) of generating the first and second signals, the first signal is a potential difference between the tracking error signal detected at the non-writable area and the center level of the tracking error signal of the adjacent data area, and the second signal is
5 a potential difference between the tracking error signal detected at the second non-writable area and the center level of the tracking error signal, the second non-writable area being different in phase from the non-writable area.

10. The method as claimed in claim 1, wherein the detrack determining step (d) determines as on-track where the beam is focused on a track center, if the variation does not exceed the threshold, and outputs the resulting value.

11. The method as claimed in claim 1, wherein the tracking servo step (e) detects the magnitude and the direction of detrack from the value and the sign of the variation, respectively.

12. The method as claimed in claim 1, wherein the tracking servo step (e) performs the tracking servo in such a manner as to equalize the level of the first signal to the level of the second signal.

13. The method as claimed in claim 1, wherein the tracking servo step (e) performs the tracking servo in such a manner that two tracking error signals of different phases is in symmetric relation with each other with respect to the center level of the adjacent data area.

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14. A method for reproducing records for optical recording medium which has a plurality of non-writable areas of different phases between writable data areas containing wobbled information on a track for recognizing a reference frequency to distinguish profiles of the data areas, the method comprising the steps of:

5 (a) determining a difference signal between optical reflecting signals each detected at the plural non-writable areas of different phases to output a variation;

(b) comparing the variation with a predetermined threshold, determining that defocus has occurred, if the variation exceeds the threshold, and outputting the resulting value; and

10 (c) performing a focus servo based on the resulting value.

15. The method as claimed in claim 14, wherein in the variation outputting step (a), the optical reflecting signals detected at the non-writable areas include read channel 2 signals generated from electrical signals output in proportion to the quantity of beam reflected from the optical recording medium.

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16. The method as claimed in claim 14, wherein in the variation outputting step (a), the optical reflecting signals detected at the non-writable areas include

read channel 1 signals generated from electrical signals output in proportion to the quantity of beam reflected from the optical recording medium.

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17. The method as claimed in claim 14, wherein in the variation outputting step (a), a peak-to-peak voltage of read channel 1 signals or read channel 2 signals detected at the non-writable areas is a first signal, and a peak-to-peak voltage of read channel 1 signals or read channel 2 signals detected at a second non-writable areas is a second signal, the second non-writable areas being different in phase from the non-writable areas, the variation being the difference between the first signal and the second signal.

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18. An apparatus for reproducing records for optical recording medium which has a plurality of non-writable areas of different phases between writable data areas containing wobbled information on a track for recognizing a reference frequency to distinguish profiles of the data areas, the apparatus comprising:

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a signal generator for generating a difference signal between optical reflecting signals from electrical signals generated from an optical pickup for recording/reproducing information on/from the optical recording medium;

a detrack detector for detecting detrack of the optical recording medium from a variation of the difference signal between the optical reflecting signals of the non-writable areas output from the signal generator, and outputting a detrack error signal;

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a tilt detector for detecting tilt of the optical recording medium from a variation of the difference signal between the optical reflecting signals of the non-writable areas output from the signal generator, and outputting a tilt error signal;

15 a defocus detector for detecting defocus of the optical recording medium from a variation of the difference signal between the optical reflecting signals of the non-writable areas output from the signal generator, and outputting a defocus error signal;

20 a servo controller for generating a tracking driving signal from the detrack error signal detected at the detract detector, a tilt driving signal from the tilt error signal detected at the tilt detector, and a focus driving signal from the defocus error signal detected at the defocus detector;

a tracking driver for controlling the optical pickup based on the tracking driving signal to compensate for detrack;

25 a tilt driver for controlling the optical pickup based on the tilt driving signal to compensate for tilt; and

a focus driver for controlling the optical pickup based on the focus driving signal to compensate for defocus.

19. The apparatus as claimed in claim 18, wherein the difference signal between the optical reflecting signals includes a read channel 2 signal or a tracking error signal.

20. The apparatus as claimed in claim 18, wherein the servo controller generates the tracking driving signal, the tilt driving signal and the focus driving signal while changing each offset in such a manner that the variables detected at the detrack detector, the tilt detector and the defocus detector decrease.